

REMARKS

Claims 1-7, 32 and 33 are pending. By this amendment, the specification is amended; claims 8-31 are cancelled without prejudice or disclaimer; claims 1, 4 and 7 are amended; and claims 32 and 33 are added. Reconsideration in view of the above amendments and following remarks is respectfully requested.

With respect to Applicants' election of Species I, Figure 5, claims 1, which is generic as indicated as in the January 23, 2002 Office Action, recites that the undercoat layer formed on the substrate has a surface with convex portions each shaped like a truncated hexagonal pyramid. As disclosed, for example, on page 14, lines 14-15 which generally describe the embodiment shown in Figures 1-6E, the surface of the undercoat layer may be formed as a texture structure, a sectionally trapezoid shape or a pit shape. As further disclosed, for example, on page 14, lines 18-20, the undercoat layer has convex portions each shaped like a truncated hexagonal pyramid which is one form of the sectionally trapezoid shape. As shown in Figures 7 and 8, which show the second embodiment of the invention, the undercoat layer includes the convex portions each shaped like truncated hexagonal pyramid. Accordingly, it is respectfully submitted that the feature of an undercoat layer formed on the substrate and having a surface with convex portions each shaped like truncated hexagonal pyramid is common to both the first embodiment shown in Figures 1-6E and to the second embodiment shown in Figures 7 and 8. Therefore, it is respectfully submitted that regardless of which species I or II which Applicants have elected, claim 1 reads on at least species I as elected.

In order to clarify Applicants' election, new claims 32 and 33 have been added. Claim 32 recites that the undercoat layer formed on the substrate has surface with a sectionally trapezoid shape and claim 33 recites that the sectionally trapezoid shape includes convex portions each shape like a truncated hexagonal pyramid. It is respectfully submitted that claims 32 and 33 also read on species I and II and are fully supported by the application as originally filed, at least by the disclosure mentioned above, for example, on page 14, lines 14-20.

Claims 1, 4 and 7 were objected. Claims 1, 4 and 7 have been amended in accordance with the suggestion of the Office Action.

Claims 1, 5 and 7 were rejected under 35 U.S.C. §102(b) over Sunakawa et al. (JP 10-312971). The rejections is respectfully traversed.

Enclosed is a copy of U.S. Patent 6,348,096 to Sunakawa et al., which is the equivalent of JP 10-312971. Please note that both U.S. Patent 6,348,096 and JP 10-312971

are based on Japanese Patent Application 9-059076 filed March 13, 1997. The following discussion of Sunakawa et al. is based on the disclosure of U.S. Patent 6,348,096.

Claim 1 recites a group III nitride compound semiconductor device including a substrate, an undercoat layer formed on the substrate and having a surface with convex portions each shaped like a truncated hexagonal pyramid and group III nitride compound semiconductor layers formed on the undercoat layer and having a device function.

The Office Action on page 4, paragraph 7 states that Sunakawa et al. disclose an undercoat layer having a surface with convex portions each shaped substantially like a truncated hexagonal pyramid in Figures 3A-3C. However as disclosed in U.S. Patent 6,348,096, Figures 3A-3C of Sunakawa et al. disclose a semiconductor device including a substrate 21 having a SiO₂ film 23 formed over the surface of the substrate that is patterned into mask areas 23 and growing areas 22 using photolithography and wet etching. Hydride VPE is employed for GaN layer 25 formation to prevent polycrystalline GaN from being deposited on the mask area 23.

It is respectfully submitted that Sunakawa et al. do not disclose or suggest an undercoat layer having a surface with convex portions each shaped substantially like a truncated hexagonal pyramid, as recited in claim 1. As discussed above reference number 25 of Sunakawa et al. refer to a GaN layer, not an undercoat layer as alleged in the Office Action. Accordingly, Sunakawa et al. cannot anticipate or render obvious claim 1.

Claims 5 and 7 recite additional features of the invention and are allowable for the same reasons discussed above with respect claim and for the additional features recited therein.

Reconsideration and withdrawal of the rejection of claims 1, 5 and 7 under 35 U.S.C. §102(b) over Sunakawa et al. are respectfully requested.

Claim 2, 3 and 6 were rejected under 35 U.S.C. §103(a) over Sunakawa et al. in view of Kern et al. (U.S. Patent 6, 194,742). The rejection is respectfully traversed.

Claims 2, 3 and 6 recite additional features of the invention and are allowable for the same reasons discussed above with respect to claim 1 and for the additional features recited therein. In addition, it is respectfully submitted that Kern et al. fail to cure the deficiencies of Sunakawa et al. with respect to claim and even assuming it would have been obvious to combine Sunakawa et al. with Kern et al., such a combination would not have resulted in the claimed invention.

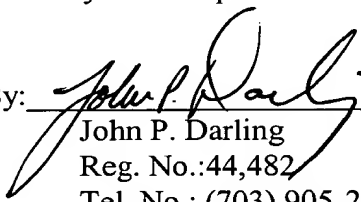
Reconsideration and withdrawal of the rejection of claims 2, 3 and 6 under 35 U.S.C. §103(a) over Sunakawa et al. in view of Kern et al. are respectfully requested.

Applicants appreciate the indication that claim 4 would be allowable if rewritten in independent form. However, in view of the above amendments, Applicants respectfully submit that all of the claims are allowable and that the entire application is in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Pillsbury Winthrop LLP

By: 
John P. Darling
Reg. No.: 44,482
Tel. No.: (703) 905-2045
Fax No.: (703) 905-2500

JPD\mtt
1600 Tysons Boulevard
McLean, VA 22102

(703) 905-2000

Enclosures:

Appendix (pp. 9-12)
U.S. Patent 6,348,096

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is amended as follows:

Page 2, delete the whole paragraph starting in line 19 and replace it with the following new paragraph:

The temperature for growing the group III nitride compound semiconductor layer by a general metal organic chemical vapor deposition method (hereinafter referred to as "MOCVD" method) is, however, 1000°C or higher. On the other hand, the growth temperature of the low-temperature sedimentary layer is approximately in a range of from 400°C to 500°C. Hence, [in a process of] from [the step of] cleaning the substrate to [the step of] forming the undercoat layer (group III nitride compound semiconductor layer), the temperature of the substrate changes into high temperature (1000°C: cleaning of the substrate), low temperature (500°C: formation of the low-temperature sedimentary layer) and high temperature (1000°C: formation of the undercoat layer). It is necessary to repeat increase and decrease of the substrate temperature largely. It is therefore, a matter of course that a long time is required for production. Moreover, it is necessary to adjust the substrate temperature in each step. In addition, it is undesirable from the point of view of thermal efficiency.

Page 8, delete the whole paragraph starting in line 18 and replace it with the following new paragraph:

Further, the inventors of the present invention have made examination [and examination eagerly] in consideration of the aforementioned problem, resulting in a conception of the present invention configured as follows.

Page 8, delete the whole paragraph starting in line 22 and replace it with the following new paragraph:

That is, a method for producing a group III nitride compound semiconductor device, comprises [the steps of]:

Page 35, delete the whole paragraph starting in line 13 and replace it with the following new paragraph:

(1) A method for producing a group III nitride compound semiconductor device, comprising [the steps of]:

Page 36, delete the whole paragraph starting in line 22 and replace it with the following new paragraph:

A method for producing a group III nitride compound semiconductor device according to anyone of the above paragraphs after (1), wherein [the step of] forming the undercoat layer is performed under the condition of a temperature in a range of from 1000°C to 1200°C.

Page 37, delete the whole paragraph starting in line 16 and replace it with the following new paragraph:

A method for producing a group III nitride compound semiconductor device according to any one of the above paragraphs after (1), further comprising [the step of] forming a sedimentary layer before [the step of] forming the undercoat layer.

Page 41, delete the whole paragraph starting in line 17 and replace it with the following new paragraph:

(6) A method for producing a laminate, comprising [the steps of]:

Page 42, delete the whole paragraph starting in line 2 and replace it with the following new paragraph:

(7) A method for producing a laminate, comprising [the steps of]:

Page 42, delete the whole paragraph starting in line 12 and replace it with the following new paragraph:

(8) A method for producing a laminate, comprising [the steps of]:

Page 42, delete the whole paragraph starting in line 22 and replace it with the following new paragraph:

A method for producing a laminate according to any one of the paragraphs (6) through (8), wherein [the step of] forming the undercoat layer is performed under the condition of a temperature in a range of from 1000°C to 1200°C.

Page 43, delete the whole paragraph starting in line 13 and replace it with the following new paragraph:

A method for producing a laminate according to any one of the paragraphs (6) and thereafter, further comprising [the step of] forming a sedimentary layer before [the step of] forming the undercoat layer.

Page 43, delete the whole paragraph starting in line 17 and replace it with the following new paragraph:

(9) A method for producing a laminate, comprising [the steps of]:

Page 44, delete the whole paragraph starting in line 22 and replace it with the following new paragraph:

A method for producing a laminate according to any one of the paragraphs (9) and thereafter, wherein [the step of] forming the undercoat layer is performed under the condition of a temperature in a range of from 1000°C to 1200°C.

Page 45, delete the whole paragraph starting in line 13 and replace it with the following new paragraph:

A method for producing a laminate according to any one of the paragraphs (9) and thereafter, further comprising [the step of] forming a sedimentary layer before [the step of] forming the undercoat layer.

Page 50, delete the whole paragraph starting in line 9 and replace it with the following new paragraph:

(17) A method for producing a group III nitride compound semiconductor device, comprising [the steps of]:

IN THE CLAIMS:

Please amend claims 1, 4 and 7 as follows:

1. (Amended) A group III nitride compound semiconductor device, comprising:

a substrate;

an undercoat layer formed on said substrate and having a surface with convex portions each shaped like a truncated hexagonal pyramid; and

[a] group III nitride compound semiconductor layers formed on said undercoat layer and having a device function.
4. (Amended) A group III nitride compound semiconductor device according to claim 2, wherein said undercoat layer is also doped with an n-type dopant and is of an n type as a whole.
7. (Amended) A group III nitride compound semiconductor device according to claim 1, wherein said group III nitride compound semiconductor layers have a function of one of a light-emitting device, a photodetector and an electronic device as a whole.

Claims 32 and 33 are new.

End of Appendix